

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Patent Application of:

Inventors: Czayka, et al.
Serial No.: 10/726,273
Filed: December 2, 2003
For: RADIATION THICKENED SHEET MOLDING COMPOUNDS
Art Unit: 1714
Examiner: T. Yoon

BRIEF ON APPEAL

To: Mail Stop Appeal Brief – Patents
 Commissioner for Patents
 P.O. Box 1450
 Alexandria, VA 22313-1450

Sir:

 This is an appeal under 37 C.F.R. §1.191 to the Board of Patent Appeals and Interferences of the United States Patent and Trademark Office from the final rejection of claims 1, 3-15, and 26-29 in the above-identified patent application. One (1) copy of Appellant's Brief on Appeal is filed herewith, and the requisite filing fee under 37 C.F.R. §1.17(f) is also paid herewith.

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I. REAL PARTY IN INTEREST

The real party in interest in the present application is Kent State University, by assignment from inventors Michael A. Czayka, Carlos Vargas-Aburto and Roberto M. Uribe. The assignment is recorded in the United States Patent and Trademark Office at Reel 015356, Frame 0418.

II. RELATED APPEALS AND INTERFERENCES

There has been no previous appeals in this application.

There have been no interferences or related litigation.

III. STATUS OF CLAIMS

The status of the claims in this application is:

1. TOTAL NUMBER OF CLAIMS IN APPLICATION

There are 20 pending claims in this application, numbered 2-4, 10-14, 19-30.

In the Office Action of December 6, 2007, the Examiner issued a final rejection of the pending claims. Claims 19-26 stand rejected as being unpatentable over U.S. Patent 4,327,145 to Mitani et al. ("Mitani") under 35 U.S.C. §102(b) and 35 U.S.C. §103(a). Claims 19-26 stand rejected as being unpatentable over U.S. Patent 3,429,950 to Parker, Jr. ("Parker I") under 35 U.S.C. §102(b) and 35 U.S.C. §103(a). Claims 19-26 also stand rejected under 35 U.S.C. §103(a) as unpatentable over Parker I in view of U.S. Patent 3,300,544 to Parker, Jr. ("Parker II"), Japanese Patent JP54120675A, or Japanese Patent JP401251791A. Claims 2-4, 10-14, and 19-30 stand rejected under 35 U.S.C. §103(a) as unpatentable over Mitani or Parker I in view of U.S. Patent 6,063,864 to Mathur et al. ("Mathur"), U.S. Patent 5,985,785 to Lane et al. ("Lane"), or Japanese Patent JP54120675A.

2. STATUS OF ALL OF THE CLAIMS

- A. Claims canceled: 1, 5-9, 15-18.
- B. Claims withdrawn from consideration but not canceled: none.
- C. Claims pending: Claims 2-4, 10-14, 19-30
- D. Claims allowed: NONE.
- E. Claims rejected: 2-4, 10-14, 19-30.

3. CLAIMS ON APPEAL

The claims on appeal are claims 2-4, 10-14, 19-30.

IV. STATUS OF AMENDMENTS

No Amendments have been filed subsequent to the Final Action of December 6, 2007.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Claim 2 recites a method of making a thickened compound comprising preparing a composition consisting essentially of at least one unsaturated oligomer resin, and at least one unsaturated monomer; and non-reversibly, partially crosslinking said composition a predetermined amount by irradiation to provide a stable, partially crosslinked composition, wherein the viscosity of said composition is increased and further wherein the partially crosslinked composition is capable of being further crosslinked (page 3, lines 8-11; page 4, line 26 - page 5, line 4; and page 7, line 27 – page 8, line 18).

Claim 3 recites a method of non-reversibly crosslinking a compound comprising preparing a composition comprising an amount of unsaturated oligomer resin, an amount of unsaturated monomer, and an amount of a free radical initiator; and irradiating the composition with high-energy electrons, wherein a plurality of non-reversible crosslinks are formed, and wherein formation of said crosslinks is dependent upon an absorbed dose and a dose rate of said high-energy electrons and the dose and dose rate are selected to provide a non-reversibly, partially crosslinked compound (page 3, lines 12-17 and page 8, lines 10-12).

Claim 4 recites a method of preparing a compound which is suitable for use in compression molding operations comprising preparing a thermoset mixture consisting essentially of an unsaturated oligomer resin, an unsaturated monomer, and a free radical initiator; forming a partially crosslinked mixture by selectively irradiating at least a portion of said thermoset mixture to a desired increased viscosity; placing said partially crosslinked mixture into a mold; and heating said mold to a temperature sufficient to convert said partially crosslinked mixture to a cured and a molded product (page 3, lines 18-25).

Claim 19 recites a molding compound consisting essentially of at least one unsaturated oligomer resin; at least one unsaturated monomer; and optionally, at least one free radical initiator; wherein said compound is non-reversibly crosslinked by irradiation within a predetermined amount to provide a stable, partially crosslinked compound, and wherein the partially crosslinked compound is capable of being further crosslinked (page 3, lines 2-7, and page 4, line 26 - page 5, line 4).

VI. GROUND OF REJECTION TO BE REVIEWED ON APPEAL

1. Whether claims 19-26 are unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a) over U.S. Patent 4,327,145 to Mitani et al. (“Mitani”).
2. Whether claims 19-26 are unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a) over U.S. Patent 3,429,950 to Parker, Jr. (“Parker I”).
3. Whether claims 19-26 are unpatentable under 35 U.S.C. §103(a) over Parker I in view of U.S. Patent 3,300,544 to Parker, Jr. (“Parker II”), Japanese Patent JP54120675A, or Japanese Patent JP401251791A.
4. Whether claims 2-4, 10-14, and 19-30 are unpatentable under 35 U.S.C. §103(a) over Mitani or Parker I in view of U.S. Patent 6,063,864 to Mathur et al. (“Mathur”), U.S. Patent 5,985,785 to Lane et al. (“Lane”), or Japanese Patent JP54120675A.

VII. ARGUMENTS

1. The Rejection of Record

In the Office Action of December 6, 2007, the Examiner issued a final rejection of the pending claims. Claims 19-26 stand rejected as being unpatentable over U.S. Patent 4,327,145 to Mitani et al. (“Mitani”) under 35 U.S.C. §102(b) and 35 U.S.C. §103(a). Claims 19-26 stand rejected as being unpatentable over U.S. Patent 3,429,950 to Parker, Jr. (“Parker I”) under 35 U.S.C. §102(b) and 35 U.S.C. §103(a). Claims 19-26 also stand rejected under 35 U.S.C. §103(a) as unpatentable over Parker I in view of U.S. Patent 3,300,544 to Parker, Jr. (“Parker II”), Japanese Patent JP54120675A, or Japanese Patent JP401251791A. Claims 2-4, 10-14, and 19-30 stand rejected under 35 U.S.C. §103(a) as unpatentable over Mitani or Parker I in view of U.S. Patent 6,063,864 to Mathur et al. (“Mathur”), U.S. Patent 5,985,785 to Lane et al. (“Lane”), or Japanese Patent JP54120675A.

2. Claims Rejections under 35 U.S.C. §102(b)

The Examiner maintains that claims 19-26 are anticipated by Mitani or by Parker I. To anticipate a claim, a reference must teach all elements of the claim (MPEP § 2131). The Applicants maintain that neither of these references teach all elements of these claims.

A. Mitani

The Examiner maintains that the recitation of “consisting essentially of” in claims 19-26 does not overcome the rejection under 35 U.S.C. §102(b) based on Mitani. The Examiner references *In re De Lajarte* (337 F.2d 870, 143 USPQ 256 (C.C.P.A. 1964)) and maintains that under this decision, the Applicants bear the burden of showing that the introduction of additional components would materially change the properties of the composition. The Examiner further alleges that the Applicants have not shown any novel characteristics of such a composition.

However, as stated previously, the specification provides clear advantages of molding compounds without thickening agents such as metal oxides.

Additionally, the Court in *De Lajarte* also states that a lack of elements is a key factor in determining that a prior reference does not anticipate an Applicant's claims. (337 F.2d at 875, 143 USPQ at 259). The presence of thickening agents can lead to high variability of product, the introduction of undesired moisture and resulting creation of unwanted chemical reactions during molding, and the possibility of a non-isotropic molded material due to flow of the molding compound. Contrary to the Examiner's assertion, these drawbacks in prior compositions are fully provided on pages 1 and 2 of the specification and would have been recognized by a person having ordinary skill in the art.

The use of "consisting essentially of" language in claim 19 only allows the presence of additional components that do not materially effect the properties of the resulting composition. In attempting to apply *De Lajarte* to this rejection, the Examiner ignores that *De Lajarte* also states that one cannot assume that small differences are incapable of causing a difference in properties. *De Lajarte* does not shift the Examiner's burden of establishing a *prima facie* case of anticipation to Applicants in the instance of "consisting essentially of" claims. In any event, the Applicants have fully provided an explanation of the advantages provided by the claimed invention, as detailed above.

Additionally, as stated previously, one of ordinary skill in the art would recognize that the inclusion of other thermoplastic components would *de facto* alter the properties of the final product or performance of the method. For example, the inclusion of isocyanates, as in Mitani, carries with it certain hazards. Isocyanates are irritants to the skin and mucous membranes and include compounds which are suspected human carcinogens. On this basis alone, the use of

isocyanates as taught by Mitani is undesirable and is contrary to the claimed methods and compositions. Additionally, one of ordinary skill in the art would also recognize that the addition of isocyanates into a composition as otherwise claimed would have distinct physical properties compared to a similar composition that was devoid of isocyanates. Furthermore, the omission of additional components such as isocyanates provides for a simplified preparation of sheet molding compounds.

Therefore, Mitani can not be said to teach or suggest a molding compound consisting essentially of at least one unsaturated oligomer resin, at least one unsaturated monomer, and optionally at least one free radical initiator. The omission of compounds present in Mitani, as in claim 19, provides a composition with basic characteristics that are novel and non-obvious over Mitani. Therefore, Mitani does not anticipate claim 19, or claims 20-26, which depend from and include all the limitations of claim 19. Reversal of the Examiner's rejection of claims 19-26 under 35 U.S.C. §102(b) as anticipated by Mitani is requested.

B. Parker I

Claims 19-26 stand rejected under 35 U.S.C. § 102(b), as anticipated by, or in the alternative under 35 U.S.C. § 103(a), as obvious over Parker I. The Examiner also references *In re De Lajarte* in connection with this rejection and maintains that the Applicants bear the burden of showing that the introduction of additional components would materially change the properties of the composition. The Examiner further alleges that the Applicants have not shown any novel characteristics of such a composition. However, as discussed above, the Court in *De Lajarte* also states that the lack of elements was a key factor in determining that the prior reference did not anticipate the Applicant's claims. *Id* at 875. Parker I provides a B-stage polyester through the use of a precise amount of "a specific class of quinone modifiers," dialkyl

p-benzoquinones (column 2, lines 38-46). Claim 19 does not permit the presence of additional components in the molding composition that materially effect the claimed composition, including Parker I's "quinone modifiers." Therefore, claim 19 recites a simplified and novel composition over that disclosed by Parker I. Reversal of the rejection of claims 19-26 as being anticipated by Parker I is requested.

3. Claims Rejections under 35 U.S.C. §103(a)

A claimed invention is unpatentable under 35 U.S.C. §103 if the differences between it and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art. 35 U.S.C. § 103 (1994); *Graham v. John Deere Co.*, 383 U.S. 1, 14 (1966); *KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, No. 04-1350, *slip op.* at 2 (2007). The ultimate determination of whether an invention is or is not obvious is a legal conclusion based on underlying factual inquiries, including (1) the scope and content of the prior art; (2) the level of ordinary skill in the art; (3) the differences between the claimed invention and the prior art; and (4) objective evidence of nonobviousness. *Graham*, 383 U.S. at 17-18; *KSR Int'l* at 2.

To reach a proper determination under §103, the Examiner must step backward in time and into the shoes of the hypothetical person of ordinary skill in the art when the invention was unknown and just before it was made. MPEP §2142. The tendency to resort to "hindsight" based upon applicant's disclosure is often difficult to avoid due to the very nature of the examination process. However, impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art. MPEP §2142.

A. Mitani

Similar to the rejection under 35 U.S.C. §102(b), the Examiner maintains that the recitation of “consisting essentially of” in claims 19-26 does not overcome the rejection under 35 U.S.C. §103(a) in view of Mitani. The Examiner references *In re De Lajarte* (337 F.2d 870, 143 USPQ 256 (C.C.P.A. 1964)) and alleges that the Applicants have not shown any novel characteristics of such a composition, as provided above. As also indicated above, the Court in *De Lajarte* also states that a lack of elements is a key factor in determining that a prior reference does not anticipate an Applicant’s claims. (337 F.2d at 875, 143 USPQ at 259). The specification provides clear advantages of molding compounds without thickening agents such as metal oxides which can cause high variability of product, the introduction of undesired moisture and resulting creation of unwanted chemical reactions during molding, and the possibility of a non-isotropic molded material due to flow of the molding compound, as provided on pages 1 and 2 of the specification.

As indicated above, the use of “consisting essentially of” language only allows the presence of additional components that do not materially effect the properties of the resulting composition. In attempting to apply *De Lajarte* to this rejection, the Examiner ignores that *De Lajarte* also states that one cannot assume that small differences are incapable of causing a difference in properties. *De Lajarte* does not shift the Examiner’s burden of establishing a *prima facie* case of obviousness to Applicants in the instance of “consisting essentially of” claims. In any event, the Applicants have fully provided an explanation of the advantages provided by the claimed invention, as detailed above.

1. Determination of the Scope and Contents of the Prior Art

Mitani provides a composition that comprises glass fibers, an unsaturated polyester, a polymerizable monomer and an isocyanate, and being free of an oxide or hydroxide of magnesium or calcium (Abstract).

2. Level of Ordinary Skill in the Art

The Examiner has not explicitly provided a statement regarding the level of ordinary skill in the art. The Applicants maintain that a person having ordinary skill in the art to which the invention pertains, polymer molding compounds, would hold an undergraduate degree in Chemistry, Chemical Engineering or a similar, closely related area.

3. Differences Between the Claimed Invention and the Prior Art

Mitani provides a molding composition that contains isocyanate in addition to an unsaturated polyester and a polymerizable monomer. The composition recited in claim 19 is devoid of isocyanate, because the composition consists essentially of at least one unsaturated oligomer resin, at least one unsaturated monomer, and optionally, at least one free radical initiator. As stated previously, one of ordinary skill in the art would recognize that the inclusion of other thermoplastic components, such as the isocyanates discussed above, would *de facto* alter the properties of the final product or performance of the method. On this basis alone, the use of isocyanates as taught by Mitani is contrary to claim 19. Additionally, one of ordinary skill in the art would also recognize that the addition of isocyanates into a composition as otherwise claimed would have distinct physical properties compared to a similar composition that was devoid of isocyanates. Furthermore, the omission of additional components, such as isocyanates, provides for a simplified preparation of sheet molding compounds. Mitani provides no teaching or suggestion that the omission of isocyanate is desirable or even possible.

Therefore, Mitani can not be said to teach or suggest a molding compound consisting essentially of at least one unsaturated oligomer resin, at least one unsaturated monomer, and optionally at least one free radical initiator. The omission of compounds present in Mitani, as in claims 19-26, provides a composition with basic characteristics that are novel and non-obvious over Mitani. Reversal of the Examiner's rejection of claims 19-26 under 35 U.S.C. §103(a) as obvious over Mitani is requested.

B. Parker I

1. Determination of the Scope and Contents of the Prior Art

Parker I indicates that it is the presence of specific modifiers in a precise quantity that makes it possible to create a B-staged polyester/monomer product. "Stable B-stage polyester resins are produced by co-polymerizing ethylically unsaturated monomers with unsaturated polyesters in the presence of a *critical* amount of dialkyl p-benzoquinone... (Abstract, emphasis added). Parker I provides no suggestion that the omission of such "quinone modifiers" is possible.

2. Level of Ordinary Skill in the Art

As stated above, the Applicants maintain that a person having ordinary skill in the art to which the invention pertains would hold an undergraduate degree in Chemistry, Chemical Engineering or a similar, closely-related area.

3. Differences Between the Claimed Invention and the Prior Art

As indicated above, Parker I provides no suggestion that the omission of "quinone modifiers" is possible in a stable B-staged polyester. Claim 19 recites a composition that

consists essentially of at least one unsaturated oligomer resin, at least one unsaturated monomer, and optionally, at least one free radical initiator. More specifically, the claimed invention provides a stable B-staged molding composition without the use of “modifiers” such as dialkyl p-benzoquinones. In contrast to claim 19, Parker I indicates that it is the presence of these specific “modifiers” in a precise quantity that makes it possible to create a B-staged polyester/monomer product (Abstract). Therefore, Parker I actually teaches away from the claimed invention.

4. Objective Evidence of Non-obviousness

The lapse of 33 years between the issuance of Parker I and the earliest priority date of the present application further demonstrates that the claimed invention is not obvious in view of Parker I, particularly in view of the known drawbacks to the use of thickening agents discussed above.

As with the previously discussed rejection, the Examiner maintains, “the recitation of ‘consisting essentially of’ alone cannot overcome the rejection based on art reciting ‘comprising,’” and cites *De Lajarte* for support for this contention. As also mentioned above, *De Lajarte* does not shift the burden of establishing a *prima facie* case from the Examiner.

Reversal of the rejections of claims 19-26 under 35 U.S.C. §103(a) as obvious over Parker I is respectfully requested.

C. Parker I in view of Parker II, JP54120675A, or JP401251791A

1. Determination of the Scope and Contents of the Prior Art

The scope and contents of Parker I are provided above and are hereby repeated with regard to the rejection in combination with Parker II, JP54120675A, or JP401251791A. While

Parker I provides the use of dialkyl p-benzoquinones to produce a B-staged polyester, Parker II provides a different quinone, 1,4-naphthoquinone, as a “polymerization modifier” for that purpose. It should also be noted that Parker I and Parker II are both continuation-in-part applications of a common parent application (Ser. No 214,856) and therefore have similar disclosures.

The translation of the abstract of JP 54120675 provides an epoxy prepeg laminated to an unsaturated polyester layer. If the abbreviations used in the translation are fully understood, the polyester comprises 100 parts by weight of an unsaturated polyester resin, 5-50 parts of a crosslinking agent, 0-2 parts of a light polymerization initiator, 1-100 parts of a thermal polymerization initiator, 0.01-1 part of a thermal polymerization inhibitor, 0-500 parts of filler(s) and 0-500 parts of reinforcing materials.

The translation of the abstract of JP 401251791 provides a wiring board that is made by using three different resins: an epoxy, a melamine and an unsaturated polyester. Again, if the abbreviations used in the translation of the abstract of are fully understood, the composition comprises 10~50 parts by weight epoxy resin having a molecular weight of 5,000 or more, 5~25 parts by weight alkylmelamine resin, 5~50 parts by weight saturated polyester. It should be noted that JP 401251791 calls for the presence of a saturated polyester, not an unsaturated polyester, as recited in the claims. Additionally, the presence of an epoxy resin and an alkylmelamine resin with the saturated polyester, which are dissolved in a mixed solvent and cured, also distinguish JP 401251791 from the present invention. One of skill in the art would not have found a teaching or suggestion of B-staged polyesters from the teaching of a B-staged epoxy/melamine/polyester combination.

2. Level of Ordinary Skill in the Art

As stated above, the Applicants maintain that a person having ordinary skill in the art to which the invention pertains would hold an undergraduate degree in Chemistry, Chemical Engineering or a similar, closely-related area.

3. Differences Between the Claimed Invention and the Prior Art

Neither Parker I nor Parker II provides any suggestion that the omission of quinone “modifiers” is possible in achieving a B-staged polyester resin. As mentioned above, Parker I indicates that it is the presence of specific dialkyl p-benzoquinone modifiers in a precise quantity that makes it possible to create a B-staged polyester/monomer product. Parker II indicates that only the use of 1,4 naphthoquinone as a polymerization modifier provides a suitable B-staged polyester. The use of other quinones, including the “closely related compound 1,2-naphthoquinone” provides unsatisfactory results (Parker II, column 6, lines 68-74). In contradistinction, the claimed invention provides a stable B-staged molding composition without the use of “modifiers” such as dialkyl p-benzoquinones or 1,4-naphthoquinone.

As with Parker I and Parker II, JP 54120675 does not teach or suggest a polyester consisting essentially of at least one unsaturated oligomer resin, at least one unsaturated monomer and optionally, at least one free radical initiator. The presence of 5-50 parts of a “crosslinking agent” makes the disclosure of JP 54120675 similar to those of Parker I and Parker II. It should also be noted that JP 401251791 calls for the presence of a saturated polyester, not an unsaturated polyester, as recited in the claims. Additionally, the presence of an epoxy resin and an alkylmelamine resin with the saturated polyester, which are dissolved in a mixed solvent and cured, also distinguish JP 401251791 from the present invention. One of skill in the art

would not have found any teaching or suggestion in any of the cited references of B-staged polyesters consisting essentially of at least one unsaturated oligomer resin, at least one unsaturated monomer and optionally, at least one free radical initiator from the cited references.

Reversal of the rejection of claims 19-26 under 35 USC § 103(a) as obvious over Parker I in light of Parker II, JP54120675A, or JP401251791A is respectfully requested.

D. Mitani or Parker I in view of Mathur, Lane or JP54120675A

1. Determination of the Scope and Contents of the Prior Art

The scope and contents of Mitani, Parker I and JP 54120675 are provided above and are hereby repeated with regard to the rejection of claims 2-4, 10-14 and 19-30. As provided above, Mitani, Parker I and JP 54120675 do not teach or suggest the molding composition recited in claims 19-26. Neither do they teach or suggest a method of making a thickened compound, a method of non-reversibly cross-linking a compound, or a method of preparing a compound, where the method includes preparing a mixture consisting essentially of an unsaturated oligomer resin and an unsaturated monomer, either with or without a free radical initiator, as recited in claims 2-4.

In reviewing the scope and contents of Mathur, it is apparent that all of Mathur's examples additionally contain "100 ppm of hydroquinone as a stabilizer" (column 4, lines 45-46). Therefore, Mathur's disclosure is similar to Parker I's disclosure in terms of the content of the composition, i.e., they require the presence of a quinone compound. Additionally, Mathur also does not provide a stable, partially cross-linked compound as recited in the claims, but instead provides heat, UV irradiation and electron beam polymerization methods in connection with complete polymerization and crosslinking.

Lane provides a metal-polymer complex in which the complex is destroyed and a metal salt in the metal-polymer complex is reduced to elemental metal during or after final cross-linking. (Abstract.) Lane does not teach or suggest the irradiation of a composition consisting essentially of at least one unsaturated oligomer resin and at least one unsaturated monomer.

2. Level of Ordinary Skill in the Art

As stated above, the Applicants maintain that a person having ordinary skill in the art to which the invention pertains would hold an undergraduate degree in Chemistry, Chemical Engineering or a similar, closely-related area.

3. Differences Between the Claimed Invention and the Prior Art

As provided above, none of Mitani, Parker I or JP 54120675 teach or suggest the molding composition recited in claims 19-26. Likewise, they do not teach or suggest a method of making a thickened compound, a method of non-reversibly cross-linking a compound, or a method of preparing a compound, where the method includes preparing a mixture consisting essentially of an unsaturated oligomer resin and an unsaturated monomer, either with or without a free radical initiator, as recited in claims 2-4. They only provide methods that involve the inclusion of isocyanate, quinone modifiers or a “crosslinking agent” as discussed above.

Similar to Parker I, Mathur requires the presence of a quinone compound in its method of polymerizing a polyester compound and only provides for complete polymerization and crosslinking of such a compound. Mathur provides no teaching or suggestion of a method of making a thickened compound comprising preparing a composition consisting essentially of at least one unsaturated oligomer resin, and at least one unsaturated monomer as recited in claim 2.

As mentioned above, Mitani requires the presence of isocyanates in the thickened compound. Lane's method requires the presence of a metal-polymer complex. Mathur and Parker I require the presence of quinones such as dialkyl p-benzoquinones as modifiers to create a thickened polymerized polyester. Additionally, JP 54120675 calls for the presence of 5-50 parts of a "crosslinking agent." None of these references, therefore, teach or suggest the use of a thickened compound as recited in claim 2. Therefore, claim 2, and claims 10-14 which depend from and include all the limitations of claim 2, patentably distinguish over Mitani or Parker I in view of Mathur, Lane or JP54120675.

Claim 3 recites a method of non-reversibly crosslinking a compound comprising: preparing a composition comprising an amount of unsaturated oligomer resin, an amount of unsaturated monomer, and an amount of a free radical initiator; and irradiating the composition with high-energy electrons, wherein a plurality of non-reversible crosslinks are formed, and wherein formation of said crosslinks is dependent upon an absorbed dose and a dose rate of said high-energy electrons and the dose and dose rate are selected to provide a non-reversibly, partially crosslinked compound. Again, Mitani requires the presence of isocyanates in the composition. Lane's method requires the presence of a metal-polymer complex in the composition. Mathur and Parker I require the presence of quinones such as dialkyl p-benzoquinones as modifiers to create a polymerized polyester composition, and JP 54120675 calls for the presence of 5-50 parts of a "crosslinking agent." While Mathur discloses the use of curing by irradiation, Mathur provides no teaching or suggestion of a method of creating a B-stage resin in this manner. Therefore, claim 3, and claims 27 and 28, which depend from and include all the limitations of claim 3, patentably distinguish over Mitani or Parker I in view of Mathur, Lane or JP54120675.

Claim 4 recites a method of preparing a compound which is suitable for use in compression molding operations comprising preparing a thermoset mixture consisting essentially of an unsaturated oligomer resin, an unsaturated monomer, and a free radical initiator, forming a partially crosslinked mixture by selectively irradiating at least a portion of said thermoset mixture to a desired increased viscosity, placing said partially crosslinked mixture into a mold, and heating said mold to a temperature sufficient to convert said partially crosslinked mixture to a cured and a molded product. As mentioned above, Mitani requires the presence of isocyanates in the molding composition. Lane's method requires the presence of a metal-polymer complex. Mathur and Parker I require the presence of quinones such as dialkyl p-benzoquinones as modifiers to create a polymerized polyester. Additionally, JP 54120675 calls for the presence of 5-50 parts of a "crosslinking agent." None of these references, therefore, teach or suggest the use of a thermoset mixture as recited in claim 4. Therefore, claim 4, and claims 29 and 30 which depend from and include all the limitations of claim 4, patentably distinguish over Mitani or Parker I in view of Mathur, Lane or JP54120675.

Claim 19 recites a molding compound consisting essentially of at least one unsaturated oligomer resin, at least one unsaturated monomer and optionally, at least one free radical initiator, wherein this compound is non-reversibly crosslinked by irradiation within a predetermined amount to provide a stable, partially crosslinked compound, and wherein the partially crosslinked compound is capable of being further crosslinked. Mitani requires the presence of isocyanates in the composition. Lane's method requires the presence of a metal-polymer complex in the composition. Mathur and Parker I require the presence of quinones such as dialkyl p-benzoquinones as modifiers to create a polymerized polyester composition, and JP 54120675 calls for the presence of 5-50 parts of a "crosslinking agent." While Mathur discloses

the use of curing by irradiation, Mathur provides no teaching or suggestion of a method of creating a B-stage resin in this manner. None of these references teach or suggest a composition as recited in claim 19. Therefore, claim 19 and claims 20-26, which depend from and include all the limitations of claim 19, patentably distinguish over Mitani or Parker I in view of Mathur, Lane or JP54120675.

4. Conclusion

The Applicants respectfully assert that all of pending claims 2-4, 10-14, 19-30 are allowable for at least the following reasons:

One of ordinary skill in the art would not have found any suggestion to combine the references to provide a molding compound consisting essentially of at least one unsaturated oligomer resin, at least one unsaturated monomer and optionally, at least one free radical initiator, wherein this compound is non-reversibly crosslinked by irradiation within a predetermined amount to provide a stable, partially crosslinked compound, and wherein the partially crosslinked compound is capable of being further crosslinked. Likewise, one of ordinary skill in the art would have found no teaching or suggestion to use such a composition in a method of making a B-staged polyester. One of ordinary skill in the art would have had no reasonable expectation of success in combining the teachings of the references as suggested by the Examiner. Such a suggestion to combine the references or expectation of success in making the combination can only be the result of impermissible hindsight.

In accordance with the foregoing, the Applicants respectfully request reversal of the Examiner and allowance of all pending claims. This Appeal Brief is timely filed on or before May 6, 2008.

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Respectfully submitted,

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VIII. APPENDIX OF CLAIMS INVOLVED IN THE APPEAL

1. (cancelled)

2. A method of making a thickened compound comprising:

preparing a composition consisting essentially of at least one unsaturated oligomer resin,
and at least one unsaturated monomer; and

non-reversibly, partially crosslinking said composition a predetermined amount by
irradiation to provide a stable, partially crosslinked composition, wherein the viscosity of said
composition is increased and further wherein the partially crosslinked composition is capable of
being further crosslinked.

3. A method of non-reversibly crosslinking a compound comprising:

preparing a composition comprising an amount of unsaturated oligomer resin, an amount
of unsaturated monomer, and an amount of a free radical initiator; and

irradiating the composition with high-energy electrons, wherein a plurality of non-
reversible crosslinks are formed, and wherein formation of said crosslinks is dependent upon an
absorbed dose and a dose rate of said high-energy electrons and the dose and dose rate are
selected to provide a non-reversibly, partially crosslinked compound.

4. A method of preparing a compound which is suitable for use in compression molding
operations comprising:

3 preparing a thermoset mixture consisting essentially of an unsaturated oligomer resin, an
4 unsaturated monomer, and a free radical initiator;

5 forming a partially crosslinked mixture by selectively irradiating at least a portion of said
6 thermoset mixture to a desired increased viscosity;

7 placing said partially crosslinked mixture into a mold; and

8 heating said mold to a temperature sufficient to convert said partially crosslinked mixture
9 to a cured and a molded product.

5-9. (cancelled)

1 10. The method of claim 2, wherein said composition further comprises materials selected
2 from the group consisting of free radical initiators, polymerization inhibitors, wetting agents,
3 antifoam agents, fillers, fibrous reinforcing materials, pigments, and mold release agents.

1 11. The method of claim 2, wherein said unsaturated oligomer resin is an unsaturated
2 polyester resin.

1 12. The method of claim 2, wherein said unsaturated monomer is styrene.

1 13. The method of claim 10, wherein said free radical initiator is an organic peroxide.

1 14. The method of claim 2, wherein said composition is non-reversibly crosslinked by
2 selective irradiation from an electron beam of high-energy electrons, with the degree of
3 crosslinking controlled by the electron energy, radiation dose and dose rate.

15-18. (cancelled)

- 1 19. A molding compound consisting essentially of:
2 at least one unsaturated oligomer resin;
3 at least one unsaturated monomer; and
4 optionally, at least one free radical initiator;
5 wherein said compound is non-reversibly crosslinked by irradiation within a predetermined
6 amount to provide a stable, partially crosslinked compound, and wherein the partially crosslinked
7 compound is capable of being further crosslinked.
- 1 20. The molding compound of claim 19, wherein the optional free radical initiator is present
2 and comprises an organic peroxide.
- 1 21. The molding compound of claim 19, wherein the at least one unsaturated monomer is
2 selected from the group consisting of styrene, methylstyrene, dimethylstyrene, vinyltoluene,
3 divinylbenzene, dichlorostyrene, methyl acrylate, ethyl acrylate, methyl methacrylate, ethyl
4 methacrylate, diallyl phthalate, vinyl acetate, triallyl cyanurate, acrylonitrile, acrylamide, and
5 mixtures thereof.
- 1 22. The molding compound of claim 21, wherein the at least one unsaturated monomer
2 consists of styrene.
- 1 23. The molding compound of claim 21, wherein the at least one unsaturated oligomer resin
2 consists of an unsaturated polyester resin.

1 24. The molding compound of claim 19, wherein said compound is non-reversibly
2 crosslinked by selective irradiation from an electron beam of high-energy electrons.

1 25. The molding compound of claim 19, comprising at least one fibrous reinforcing material,
2 wherein the amount of crosslinking inhibits flow of said reinforcing materials when the
3 compound is subjected to elevated temperatures.

1 26. The molding compound of claim 19 additionally containing one or more polymerization
2 inhibitors, one or more wetting agents, one or more antifoam agents, one or more fillers, one or
3 more fibrous reinforcing materials, one or more pigments, one or more mold release agents, or
4 combinations thereof.

1 27. The method of claim 3, wherein said unsaturated oligomer resin is an unsaturated
2 polyester resin.

1 28. The method of claim 27, wherein the at least one unsaturated monomer is selected from
2 the group consisting of styrene, methylstyrene, dimethylstyrene, vinyltoluene, divinylbenzene,
3 dichlorostyrene, methyl acrylate, ethyl acrylate, methyl methacrylate, ethyl methacrylate, diallyl
4 phthalate, vinyl acetate, triallyl cyanurate, acrylonitrile, acrylamide, and mixtures thereof.

1 29. The method of claim 4, wherein said unsaturated oligomer resin is an unsaturated
2 polyester resin.

1 30. The method of claim 29, wherein the at least one unsaturated monomer is selected from
2 the group consisting of styrene, methylstyrene, dimethylstyrene, vinyltoluene, divinylbenzene,
3 dichlorostyrene, methyl acrylate, ethyl acrylate, methyl methacrylate, ethyl methacrylate, diallyl
4 phthalate, vinyl acetate, triallyl cyanurate, acrylonitrile, acrylamide, and mixtures thereof.

IX. EVIDENCE APPENDIX

EXHIBIT 1
Office Action dated December 6, 2007

EXHIBIT 2
U.S. Patent No. 4,327,145 to Mitani et al.

First Reviewed by the Examiner July 17, 2007.

First Cited by the Examiner in an Office Action July 25, 2007.

EXHIBIT 3
U.S. Patent No. 3,429,950 to Parker (Parker I)

First Reviewed by the Examiner August 21, 2006.

First Cited by the Examiner in an Office Action August 29, 2006.

EXHIBIT 4

U.S. Patent No. 3,300,544 to Parker (Parker II)

First Reviewed by the Examiner February 5, 2007.

First Cited by the Examiner in an Office Action February 8, 2007.

EXHIBIT 5

JP No. 54120675

First Reviewed by the Examiner February 5, 2007.

First Cited by the Examiner in an Office Action February 8, 2007.

EXHIBIT 6

JP No. 401251791

First Reviewed by the Examiner February 5, 2007.

First Cited by the Examiner in an Office Action February 8, 2007.

EXHIBIT 7

U.S. Patent No. 6,063,864 to Mathur

First Reviewed by the Examiner August 21, 2006.

First Cited by the Examiner in an Office Action August 29, 2006.

EXHIBIT 8

U.S. Patent No. 5,985,785 to Lane

First Reviewed by the Examiner August 21, 2006.

First Cited by the Examiner in an Office Action August 29, 2006.

X. RELATED PROCEEDINGS APPENDIX

NONE